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Formation and Occurrence of Bacterial Gas

Bacterial gases occur in commercial quantities in a) conventional settings i.e. sedimentary basins with high sedimentation rates and low geothermal gradients and b) non-conventional settings i.e. shale-hosted and coal gas and tight sand plays. High sedimentation rates have a twofold effect namely 1) preservation of organic matter throughout the sedimentary section and 2) prevention of escape of shallow gas. Two principles make the best bacterial gas machines 1) kitchen and reservoir are not separate and 2) bacterial gases form disseminated in the sedimentary column and require uninhibited accumulation from large sedimentary volumes. Giant bacterial 1tcf gas fields in Italy are gentle drape-over anticlines in Miocene to Pliocene turbiditic sequences, which provide large capture areas for accumulation of disseminated bacterial gas. However, thermogenic gases do not occur in younger Tertiary sections. In contrast, Gulf of Mexico settings are complex Minibasins caused by salt withdrawal. Growth faults and salt domes provide highs during the formation history of these basins and offer locations of early bacterial gas accumulations. Continued subsidence and faulting provide migration pathways for thermogenic gases, which accumulate in the same reservoirs in which bacterial gases already accumulated. Ubiquitous mixed thermogenic-bacterial gas signatures suggest that this mixing is pervasive in this dynamic salt withdrawal setting. The world's largest gas accumulation in Urengoy in West Siberia, is of unclear origin, and excluding Urengoy, bacterial gases provide only 10% of the total gas production, however, in those areas with optimal formation and accumulation conditions, bacterial gases can constitute 25% (Gulf of Mexico) and even up to 80% (Apennine Foredeep) of the gas production in a basin.